AMBIENT AIR QUALITY DATA REPORT

1985

STATE OF NORTH CAROLINA

CONTENTS

EXECUTIVE SUMMARY

Ambient air monitoring was conducted at 118 sites operated by state and local agencies in North Carolina. The 1985 ambient air quality data are presented following a description of the pollutants.

During 1985, there were 72 total suspended particulate sites reporting no exceedances of the ambient air quality standards, and 8 sites reporting exceedances. Most of these exceedances were the results of dry weather, pollen and forest fires.

In 1985, there were seven carbon monoxide sites reporting no exceedances of the ambient air quality standards, and four sites in three cities reporting exceedances. In all three cities air pollution control efforts are implemented or are being implemented to achieve compliance with the ambient air quality standards.

There were no exceedances reported from twenty ozone sites across the state during 1985. The cool temperatures of the 1985 summer helped in keeping the 1985 ozone measurements lower than normal.

In 1985, nine sulfur dioxide sites reported no exceedances of the ambient air quality standards. Eight additional sites, which did not run in 1985, reported no exceedances in 1984.

No exceedances of the ambient air quality standards for nitrogen dioxide were reported in 1985 at two sites.

Lead sampling was not conducted in 1985 due to low values previously measured, and the decreased used of leaded fuels. No lead exceedances were reported in North Carolina by ambient air monitors.

The intent of this report is to present the most current year of air quality data not to present a technical data analysis. A more comprehensive report of data trends is available for years prior to 1985 by contacting the Air Quality Section, Division of Environmental Management, P. O. Box 27687, Raleigh, N.C. 27611-7687.

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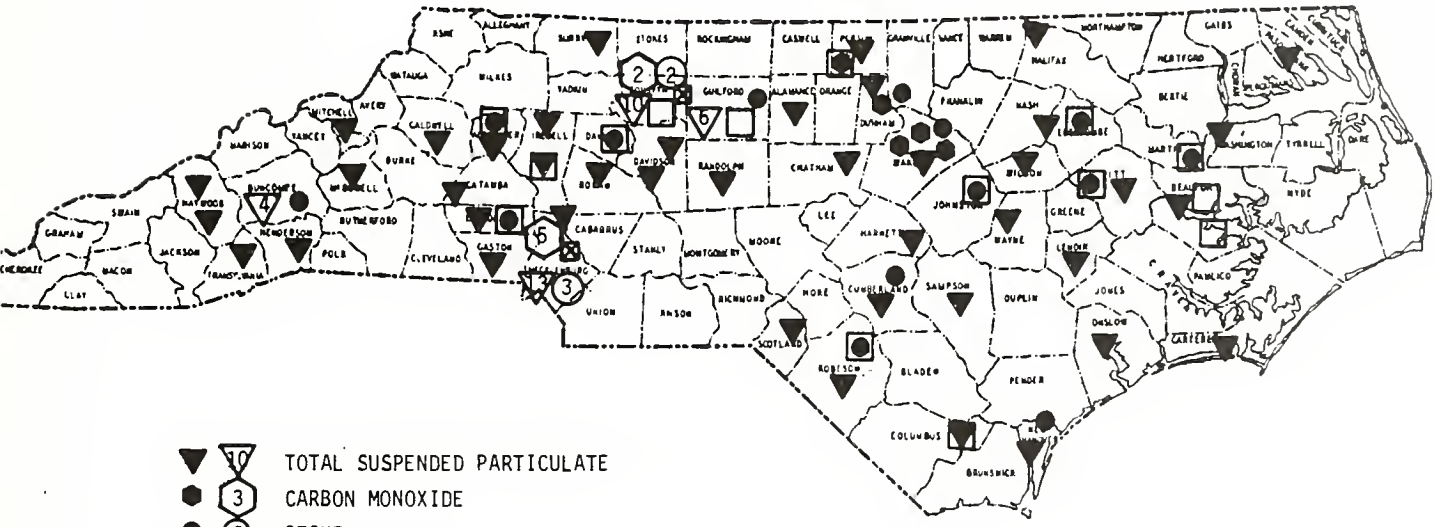
I. Ambient Air Monitoring Program Description

Ambient monitoring and analysis of samples were conducted by the Division of Environmental Management and four local air pollution programs. These programs were the Forsyth County Environmental Affairs Department, Guilford County Department of Environmental Health, Mecklenburg County Department of Environmental Health, and Western N.C. Regional Air Pollution Control Agency (Buncombe and Haywood counties). The collected air monitoring data are used to determine if air quality standards are being met, to assist in enforcement action, to determine the improvement or decline of air quality and to determine the extent of industrial expansion allowable.

The sites are listed as a part of the data summary in Section III Pollutant Description and Data. A map showing the general locations of the ambient air monitoring sites is shown below:



Specific monitor siting involves considerations such as representativeness of site, distance from roadways and nearby sources, unrestricted air flow, safety, availability of electricity and security.

All sites have a particularly defined monitoring objective and annual evaluations are made to assure that the objectives are met. The four basic monitoring objectives are:

1. to determine the highest concentration expected in an area,
2. to determine representative concentrations in areas of high population density,
3. to determine the impact of significant sources or source categories on ambient air quality, and
4. to determine general background concentration levels.

All monitors have known precision, accuracy, interferences and operational parameters. The monitors, as well as all measurement devices, are carefully calibrated at predetermined frequencies, varying from daily to quarterly. Measurements are traceable to the National Bureau of Standards when standards are available.

Standard operating procedures are followed in monitoring and analyses. Field personnel visit the manual sites once every sixth day to replace sample media and check the operation and calibration of the monitors. Continuous monitors are checked at least twice weekly for correct instrument operation.

Quality assurance activities determine the quality of the collected ambient data, improve the quality of the data and evaluate how well the monitoring system operates. The objectives of the quality assurance activities are to produce high quality air pollution data with defined completeness, precision, accuracy, representativeness and comparability.

At most sites microcomputers are being used to collect the data. The data system assembles the data and prepares data for submittal to the federal Environmental Protection Agency. Numerous checks are conducted to ensure that only valid data are reported.

II Ambient Air Quality Standards

In any evaluation of air quality data, the ambient air measurements are compared to air quality standards. The primary standards were established allowing an adequate margin of safety for protection of public health. Secondary standards were established with an adequate margin of safety to protect the public welfare from adverse effects associated with pollutants in the ambient air. Public welfare is measured by effects on vegetation, animals, materials and visibility. The national primary and secondary standards and the North Carolina ambient air quality standards are summarized below.

TABLE 1

SUMMARY OF NATIONAL AND N.C.
AMBIENT AIR QUALITY STANDARDS

Pollutant	Time of Avg.	Nat. Prim. Std	Nat. Sec. Std	N.C. Std
TSP	Ann. Geo. Mean	75 $\mu g/m^3$	None	75 $\mu g/m^3$
	24 Hour	260 $\mu g/m^3$	150 $\mu g/m^3$	150 $\mu g/m^3$
SO_2	Ann. Arith Mean	80 $\mu g/m^3$	None	80 $\mu g/m^3$
	24 Hour	365 $\mu g/m^3$	None	365 $\mu g/m^3$
	3 Hour		1300 $\mu g/m^3$	1300 $\mu g/m^3$
NO_2	Ann. Arith Mean	100 $\mu g/m^3$	Same as prim.	100 $\mu g/m^3$
CO	8 Hour	10 mg/m^3	None	10 mg/m^3
	1 Hour	40 mg/m^3	None	40 mg/m^3
O_3	1 Hour	0.12 ppm	Same as prim.	0.125 ppm
Pb	Quarterly Arith Mean	1.5 $\mu g/m^3$	Same as prim.	1.5 $\mu g/m^3$

Note: All standards with averaging times of 24 hours or less are not to be exceeded more than once per year.

$\mu g/m^3$ - micrograms per cubic meter of air
mg/m^3 - milligrams per cubic meter of air
ppm - parts per million (for ozone 1 ppm = 1960 $\mu g/m^3$)

III. Pollutant Descriptions and 1985 Ambient Air Quality Data

There are many factors that affect the quality of air in an area. Air quality is a function of meteorological conditions as well as location and size of pollution sources. The speed and direction of air movement determine whether a pollutant emission causes a problem and where the problem exists. Other meteorological factors that affect pollutant concentrations include atmospheric stability, precipitation, solar radiation and temperature. Geographic factors that affect concentrations include variables such as urban or rural, and mountains, valleys or plains. Economic factors that are important include concentration of industries, boom or recession, weekday or weekend. All of these variations may affect air pollution patterns either on a short term or long term basis.

Air quality may also be influenced by an "exceptional event." Such an event may be natural or man-made and may cause the data to be biased. Most high data and all exceedances are examined to detect "exceptional events" and to avoid misuse or misinterpretation of the data. All valid data, whether "exceptional events" or not, are included in this report.

Ambient Data

There were 115 air pollutant monitors operated by state or local agencies in North Carolina in 1985. A summary of the valid 1985 ambient air quality data collected is presented following a description of each pollutant. To save operating costs, the monitor operations at some sites are suspended for two years and operated on the third year. For those monitors not operating during 1985, data for prior years are included in this data report.

A. Particulate Matter - Total Suspended Particulate

Atmospheric particulate matter is defined as any material, except uncombined water, (water, mist, steam, etc.) which exists in a finely divided form as a liquid or solid at standard temperature and pressure (25° C and 760 mm mercury).

SOURCES

Particulates are emitted by many of man's activities, such as fuel combustion, motor vehicle operation and movement, industrial processes, grass mowing, agricultural tilling and open burning. Natural sources include wind-blown forest fires, volcanic eruptions and vegetation releasing pollen.

Particles that are emitted directly from a source may be either fine or coarse, but particles which are formed in the atmosphere will usually be fine. Generally, course particles (2.5 - 60 microns) have very slow settling velocities and are characterized as suspended particulate matter. Fine particles (less than 2.5 microns) typically originate by condensation of materials produced during combustion or atmospheric transformation.

EFFECTS

Health effects of particulate matter include effects on the breathing system, aggravation of existing lung and heart disease, effects on lung clearance, changes in form and structure of organisms and may cause cancer. The individuals most sensitive to the effects of particulate matter include individuals with chronic obstructive lung or heart disease, individuals with flu, asthmatics, the elderly, children and mouth breathers.

Welfare effects are those that influence one's quality of life other than human effects. Particulate matter can form a film on plant leaves, reducing sunlight and subsequently interfering with photosynthesis. Other effects of particles include soiling and degradation of property, which can be costly in terms of cleaning and maintaining surfaces. Reduction of visibility occurs when small particles absorb or scatter visible light.

At the present the Environmental Protection Agency is adopting a new primary (health) standard which addresses small particles which are most likely to affect health.

POLLUTANT: TOTAL SUSPENDED PARTICULATES STATE: 34 NORTH CAROLINA YEAR: 1985

AREA	SITE	LOCATION	SAMPLING PERIOD	NUM OBS	MIN	MAX 1ST	MAX 2ND	MAX 3RD	ARITH MEAN	GEO MEAN	GSD	EXCEEDANCES * PRIMARY #>260	PRIMARY GM>75	SECONDARY #>150	SECONDARY GM>60
0080	003	F01 / TAYLORSVILLE, MAIN AVE.	JAN-DEC	62	8	70	48	44	35	31	1.58				
0160	003	F01 ASHEBORO/ ASHEBORO, WATER FILTRATION PLANT	JAN-DEC	51	6	86	83	82	40	36	1.67				
0180	003	I01 ASHEVILLE/ ASHEVILLE, HEALTH & WELFARE BLDG W	JAN-DEC	61	4	80	73	71	39	35	1.64				
0300	003	F02 BELMONT/ NORTH BELMONT, MT. HOLLY RD.	JAN-FEB	8	23	49	40	36	35	34	1.29				
0420	002	F02 BREVARD/ BREVARD, HWY 64	JAN-DEC	55	10	115	100	100	50	46	1.57				
0440	001	F02 BURLINGTON/ BURLINGTON, FIRE DEPT NO 2	JAN-DEC	59	12	102	90	96	47	44	1.55				
0480	025	I02 BUNCOMBE CO/ BUNCOMBE, AIRPORT	JAN-DEC	51	9	65	64	62	32	29	1.64				
0480	026	I02 BUNCOMBE CO/ BUNCOMBE, GROVE STONE	JAN-DEC	59	15	93	88	79	42	38	1.55				
0480	027	I02 BUNCOMBE CO/ BUNCOMBE, CANDLER	JAN-DEC	59	16	88	84	78	43	40	1.50				
0580	002	I02 CANTON/ CANTON, FIRE DEPT ROOF	JAN-DEC	60	23	176	142	128	69	62	1.58			1	*
0680	004	F01 CHAPEL HILL/ CHAPEL HILL,WATER TANK	JAN-FEB	8	27	73	45	44	42	40	1.34				
0700	001	G01 CHARLOTTE/ CHARLOTTE, CITY HALL 600 E TRADE S	JAN-DEC	61	16	105	90	84	53	49	1.49				
0700	002	G01 CHARLOTTE/ CHARLOTTE, COMMUNITY HOSP 8016 S G	JAN-DEC	60	15	158	126	108	62	56	1.62			1	
0700	003	G01 CHARLOTTE/ CHARLOTTE, FIRE STA NO 11	JAN-DEC	61	13	120	110	90	56	51	1.57				
0700	010	G01 CHARLOTTE/ CHARLOTTE, NO 10 FIRE STA	JAN-DEC	60	14	95	85	84	48	44	1.51				
0700	011	G01 CHARLOTTE/ CHARLOTTE, CO HEALTH DEPT ROOF	JAN-DEC	61	10	70	68	65	40	38	1.49				
0700	026	G02 CHARLOTTE/ CHARLOTTE, WOODLAWN VFD DEPT	JAN-DEC	56	10	75	73	68	44	41	1.53				
0700	028	G01 CHARLOTTE/ CHARLOTTE, 1501 N I-85	JAN-DEC	57	10	101	78	73	43	39	1.58				
0720	003	F01 CHATHAM CO/ MONCURE, CHATHAM CO	JAN-DEC	56	8	104	74	70	41	38	1.56				
0860	002	F01 CLINTON/ CLINTON WELL #3,5, BLVD. 40 OF BOX 1	JAN-DEC	59	13	119	96	82	46	41	1.57				
0880	001	F02 COLUMBUS CO/ ACME-DELCO SAMPLING SITE HWY 87	JAN-DEC	60	11	86	85	83	38	34	1.62				
1040	001	G01 DAVIDSON/ DAVIDSON FILTER PLANT	JAN-DEC	58	10	70	67	62	36	33	1.51				
1120	001	F01 DUNN/ DUNN MUNICIPAL BLDG	JAN-DEC	61	14	106	104	98	52	47	1.58				
1160	001	F01 DURHAM/ DURHAM, COUNTY HEALTH BLDG 300 E MAIN	JAN-DEC	55	21	81	81	80	49	47	1.39				
1160	007	F01 DURHAM/ DURHAM, WATTS HOSP.	JAN-FEB	8	28	46	42	37	35	35	1.19				
1320	001	F01 ELIZABETH CITY/ ELIZABETH CITY, WATER PLT N W	JAN-DEC	60	14	246	112	97	46	39	1.75			1	
1420	004	F01 FAYETTEVILLE/ 3296 VILLAGE DRIVE	JAN-DEC	60	10	95	93	90	49	44	1.58				
1480	001	G03 FORSYTH CO/ WALKERTOWN, GRUBBS RD OFF PINE HA	JAN-DEC	60	10	91	82	64	38	35	1.52				
1480	004	G01 FORSYTH CO/ WINSTON SALEM, PRINCE IBRAHAM	JAN-DEC	58	9	122	90	80	41	37	1.58				
1580	014	F01 GASTONIA/ RANKIN LAKE RD	JAN-DEC	58	8	70	69	64	34	32	1.49				
1620	004	F01 GOLDSBORO/ HWY 70 WEST PATROL STA.GOLDSBORO,N	JAN-DEC	58	18	126	109	107	57	51	1.61				
1740	009	G01 GREENSBORO/ GREENSBORO, EDGEWORTH & BELLEMEAD	JAN-DEC	61	10	77	72	71	42	39	1.53				
1740	010	G01 GREENSBORO/ GREENSBORO, LATHAM TOWN (HUNTER S	JAN-DEC	61	10	98	74	71	46	42	1.56				
1760	002	F01 GREENVILLE/ GREENVILLE, N PLANT ST	JAN-DEC	55	14	103	94	71	40	36	1.58				
1780	012	G01 GREENSBORO/ 409 FRIENDWAY DR	JAN-DEC	61	11	106	103	100	49	43	1.67				
1860	006	I02 HAYWOOD CO/ HAZELWOOD, FIRE DEPT BROWN AVE	JAN-DEC	55	14	101	100	99	48	44	1.54				
1920	005	F01 HENDERSONVILLE/ US 25 & US 64 HENDERSONVILLE	JAN-DEC	61	10	96	89	89	47	43	1.56				
1960	004	F01 HICKORY/ 1650 1ST. ST.	JAN-DEC	58	14	99	97	93	55	50	1.54				
2000	003	G02 HIGH POINT/ HIGH POINT, ENGLISH ROAD	JAN-DEC	57	15	131	92	84	51	47	1.52				
2000	004	G01 HIGH POINT/ HIGH POINT, SPRINGFIELD (HWY PATR	JAN-DEC	60	13	78	70	69	42	39	1.49				
2000	005	G01 HIGH POINT/ E GREEN ST. HIGH POINT N C	JAN-DEC	61	12	105	98	96	56	51	1.60				
2060	002	F02 IREDELL CO/ TROUTMAN, ST. RD. 2350	JAN-DEC	60	10	66	65	62	36	33	1.53				
2100	004	F01 JACKSONVILLE/ 2553 ONSLOW DRIVE	JAN-DEC	60	17	107	107	87	47	44	1.51				
2160	004	F02 KANNAPOLIS/ KANNAPOLIS,FLOYD STREET	JAN-DEC	58	10	104	85	82	52	49	1.52				
2180	001	G01 KERNERSVILLE/ KERNERSVILLE, BODENHEIMER ST	JAN-DEC	54	13	90	81	78	51	48	1.44				
2220	003	F01 KINSTON/ 1700 MARKET ST	JAN-DEC	51	12	101	89	72	39	35	1.61				

* THE PRIMARY AMBIENT AIR QUALITY STANDARD IS 75 UG/M3 ANNUAL GEOMETRIC MEAN, AND A MAXIMUM OF 260 UG/M3 AVERAGED OVER A 24-HOUR PERIOD NOT TO BE EXCEEDED MORE THAN ONCE PER YEAR. THE SECONDARY STANDARD IS 150 UG/M3, A 24 HOUR MAX NOT TO BE EXCEEDED MORE THAN ONCE PER YEAR. A 60 UG/M3 AGM "GUIDE" IS USED TO ASSESS VIOLATIONS OF THE 24-HOUR SECONDARY STANDARD

POLLUTANT: TOTAL SUSPENDED PARTICULATES STATE: 34 NORTH CAROLINA YEAR: 1985

AREA	SITE	LOCATION	SAMPLING PERIOD	NUM OBS	MIN	MAXIMA 1ST	MAXIMA 2ND	MAXIMA 3RD	ARITH MEAN	GEO MEAN	GSD	EXCEEDANCES * PRIMARY >260	PRIMARY GM>75	SECONDARY >150	SECONDARY GM>60
2240	003 F03	LAURINGBURG/ LAURINGBURG WAST TREATMENT PLANT	JAN-DEC	60	14	135	127	109	42	36	1.69				
2300	003 F03	LENOIR/ HWY 321 NORTH LENOIR	JAN-DEC	59	6	86	78	73	42	38	1.62				
2340	002 F01	LEXINGTON/ LEXINGTON, WATER TOWER	JAN-DEC	52	15	137	92	90	57	53	1.50				
2380	002 F01	LINCOLNTON/ LINCOLNTON, CITY JAIL	JAN-DEC	59	15	75	71	70	46	43	1.45				
2460	003 F01	LUMBERTON/ LUMBERTON,S.6ATER STREET	JAN-DEC	61	12	110	99	93	45	41	1.62				
2540	002 F01	MARION/ MARION,COURT HOUSE	JAN-DEC	60	17	121	113	108	60	56	1.52				
2580	001 G01	MECKLENBURG CO/ MINT HILL, TEL SUBSTATION	JAN-DEC	50	10	32	64	64	37	34	1.57				
2580	003 G01	MECKLENBURG CO/ MECKLENBURG, HUNTERSVILLE	JAN-DEC	56	10	85	70	68	36	33	1.58				
2580	004 G01	MECKLENBURG CO/ MECKLENBURG, PAW CREEK	JAN-DEC	58	10	98	97	81	41	37	1.62				
2580	005 G02	MECKLENBURG CO/ MECKLENBURG COUNTY, ARROWOOD	JAN-DEC	60	11	154	152	152	62	54	1.73			3	
2580	006 G02	MECKLENEURG CO/ MECKLENBURG, DUKE POWER NECK	JAN-DEC	57	10	61	58	57	32	29	1.51				
2720	003 F05	MOREHEAD CITY/ ARENDELL STREET AT NC PORT	JAN-DEC	57	21	199	163	133	68	61	1.62			2	*
2760	002 F02	MOUNT AIRY/ MT AIRY,SEWAGE TREATMENT PLANT	JAN-DEC	58	13	118	88	83	46	42	1.57				
2860	001 F01	NEW BERN/ NEW BERN, WTR TRT PLT W BROAD ST	JAN-FEB	8	20	84	48	40	38	34	1.61				
3160	002 F01	PLYMOUTH/ PLYMOUTH, OLD LONG ACRE RD	JAN-DEC	61	7	300	140	104	49	41	1.80	1		1	
3240	003 F01	RALEIGH/ RALEIGH, FIRE DEPT =9 4465 SIX FORKS	JAN-DEC	61	13	82	73	71	44	41	1.47				
3360	002 F02	ROANOKE RAPIDS/ ROANOKE RAPIDS,RECREATION CEN	JAN-DEC	61	21	224	158	146	56	49	1.65			2	
3440	002 F01	ROCKY MOUNT/ ROCKY MOUNT,WTP	JAN-DEC	55	7	95	91	90	52	47	1.67				
3480	001 F02	ROXBORO/ ROXBORO, WATER PLANT CHUB LAKE ROAD	JAN-DEC	59	7	85	70	67	34	30	1.66				
3540	005 F01	SALISBURY/ CHURCH STREET	JAN-DEC	61	14	79	78	77	48	46	1.43				
3880	001 F02	SPRUCE PINE/ SPRUCE PINE 1 CITY HALL SUMIT S	JAN-DEC	61	16	112	103	101	52	47	1.57				
3880	003 F05	SPRUCE PINE/ SPRUCE PINE, SPRUCE PINE COMM HO	JAN-FEB	9	22	94	57	52	42	37	1.62				
3920	002 F01	STATESVILLE/ STATESVILLE, 300 S TRADD ST	JAN-DEC	55	14	92	85	84	50	46	1.51				
4020	001 F02	THOMASVILLE/ THOMASVILLE, CITY HALL 7 W GUILF	JAN-DEC	59	21	93	93	89	54	51	1.42				
4220	003 F01	WASHINGTON/ WASHINGTON,WATER TOWER, 3RD & TEL	JAN-DEC	57	12	154	137	112	47	41	1.64			1	
4400	002 F01	WILMINGTON/ WALNUT AND WATER STREETS	JAN-DEC	59	11	92	84	73	45	42	1.48				
4420	002 F01	WILSON/ WILSON WATER TANK	JAN-DEC	61	14	118	96	92	50	46	1.59				
4460	009 G02	WINSTON-SALEM/ WINSTON SALEM HANES HOSIERY PK	JAN-DEC	60	13	102	101	101	61	57	1.52				
4460	013 G02	WINSTON-SALEM/ WINSTON SALEM, RIDGE AVENUE	JAN-DEC	57	10	90	88	88	54	51	1.49				
4460	014 G01	WINSTON-SALEM/ WINSTON SALEM, STADIUM DRIVE	JAN-DEC	57	8	95	79	79	53	49	1.49				
4460	015 G01	WINSTON-SALEM/ WINSTON SALEM, HUTTON STREET	JAN-DEC	59	10	89	79	78	50	47	1.44				
4460	017 G02	WINSTON-SALEM/ WINSTON SALEM, FAIRCHILD RD	JAN-DEC	60	9	99	92	83	46	42	1.53				
4460	020 G01	/ SILAS CREEK	JAN-DEC	57	14	89	78	75	47	45	1.39				
4460	021 G01	WINSTON-SALEM/ SIXTH & BROAD ST FRIENDS CHURC	JAN-DEC	61	10	96	78	76	48	46	1.42				

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* THE PRIMARY AMBIENT AIR QUALITY STANDARD IS 75 UG/M3 ANNUAL GEOMETRIC MEAN, AND A MAXIMUM OF 260 UG/M3 AVERAGED OVER A 24-HOUR PERIOD NOT TO BE EXCEEDED MORE THAN ONCE PER YEAR. THE SECONDARY STANDARD IS 150 UG/M3, A 24 HOUR MAX NOT TO BE EXCEEDED MORE THAN ONCE PER YEAR. A 60 UG/M3 AGM "GUIDE" IS USED TO ASSESS VIOLATIONS OF THE 24-HOUR SECONDARY STANDARD

B. Carbon Monoxide

Carbon monoxide (CO) is the most commonly occurring air pollutant, and it is also the most widely distributed. It is estimated that total CO emissions to the atmosphere comprise approximately 60% of all pollutant emissions in North Carolina.

SOURCES

Most atmospheric CO is produced by incomplete combustion of fuels for vehicles, space heating, industrial processes and solid waste combustion. Transportation activities account for the majority of the CO emissions. Boilers and other fuel burning heating systems are also major sources.

EFFECTS

Breathing carbon monoxide affects the oxygen carrying capacity of the blood in both sick and healthy individuals. Hemoglobin in the blood attaches to CO more readily than it does to oxygen, thus depriving the body of vital oxygen.

Carbon monoxide diminishes the function of even healthy individuals. Individuals with anemia and lung diseases are particularly sensitive to CO effects. At low concentrations mental function, vision, and alertness are affected. It appears that cardiac damage may result from chronic exposure to CO at levels as low as 80 mg/m^3 (70 ppm). Other health effects associated with exposure to CO include central nervous system effects and pulmonary function difficulties.

Ambient concentrations apparently do not adversely affect vegetation or materials. The effects on animals are similar to those on humans.

POLLUTANT: CARBON MONOXIDE STATE: 34 NORTH CAROLINA YEAR: 1985

AREA	SITE	LOCATION	SAMPLING PERIOD	METHOD	NUM OBS	MIN	MAXIMA 1-HOUR 1ST	MAXIMA 1-HOUR 2ND	MAXIMA 8-HOUR 1ST	MAXIMA 8-HOUR 2ND	EXCEEDANCES * 1-HOUR #>40	EXCEEDANCES * 8-HOUR #>10
0700	029 G01	CHARLOTTE/ CHARLOTTE, FEDERAL RESERVE 401 S T	JAN-DEC	11	8594	0.6	16	13	8	6		
0700	031 G01	CHARLOTTE/ CHARLOTTE, PARK ROAD, 4400 PARK RD	JAN-DEC	11	8602	0.6	15	14	10	10		
0700	032 G05	CHARLOTTE/ CHARLOTTE, CENTRAL, 5137 CENTRAL A	JAN-DEC	11	8559	0.6	23	19	14	12		3
0700	034 G01	CHARLOTTE/ PLAZA ROAD AND LAKEDELL	JAN-DEC	11	8346	0.6	18	15	9	7		
0700	035 G01	CHARLOTTE/ GREENVILLE NEIGHBORHOOD CNTR	JAN-DEC	11	8461	0.6	15	12	9	8		
1160	008 F01	DURHAM/ DURHAM OLD HEALTH BLDG 302 E MAIN ST	JAN-DEC	11	7718	0.3	26	23	15	15		7
3240	010 F01	/ 309 S. WILMINGTON STREET	JAN-DEC	11	7738	0.3	24	22	13	12		9
3240	011 F05	RALEIGH/ 420 SOUTH PERSON STREET	JAN-DEC	11	4340	0.3	25	23	17	13		4
3240	012 F01	RALEIGH/ 5307 SIX FORKS ROAD	JAN-DEC	11	8327	0.3	9	9	6	6		
4460	018 G01	WINSTON-SALEM/ MAIN ST. COURTHOUSE BLDG SECON	JAN-DEC	11	8516	0.3	14	12	6	6		
4460	019 G01	WINSTON-SALEM/ QUEEN STREET MILLER PARK HORSE	JAN-DEC	11	8386	0.3	14	12	9	9		

* THE AIR QUALITY STANDARDS FOR CARBON MONOXIDE ARE 40 MG/M3, MAX 1-HOUR CONCENTRATION NOT TO BE EXCEEDED MORE THAN ONCE PER YEAR, AND 10 MG/M3, MAXIMUM 8-HOUR CONCENTRATION NOT TO BE EXCEEDED MORE THAN ONCE PER YEAR.

C. Ozone

Ozone (O_3) is the major compound of the complex mixture of compounds known as photochemical oxidants.

SOURCES

Ozone is not usually emitted directly into the atmosphere as are the other criteria pollutants, but is formed by a series of complex reactions involving hydrocarbons, nitrogen oxides and sunlight. Ozone concentrations are higher during the daytime in late spring, summer and early autumn when temperature is above 60°F and the sunlight is more intense. North Carolina's ozone "season" is April through October. Two natural sources of ozone are electrical discharge during thunderstorms and solar radiation in the stratosphere. Those two sources are not believed to be significant in the lower atmosphere.

EFFECTS

Ozone is a pulmonary irritant and affects the respiratory mucous membranes as well as other lung tissues and respiratory functions. Studies have demonstrated ozone impairment of the normal function of the lung, causing shallow, rapid breathing and a decrease in pulmonary function. Other symptoms of ozone exposure include chest tightness, coughing and wheezing. People with asthma, bronchitis and emphysema will probably experience breathing difficulty when exposed to short term concentrations between 0.15 and 0.25 ppm.

Ozone accelerates the aging of many materials, causing rubber cracking, fading of dyes and paint erosion, and it causes plant damage. In general, ozone injury to vegetation develops initially at the tips of young leaves and becomes more widespread as the leaves mature. The most common ozone symptoms on broad-leaved plants are small flecks visible on the upper leaf surface. This problem has been severe on sensitive varieties of tobacco and is generally referred to as weather fleck. Some of the agricultural and garden vegetation affected include tobacco, corn, soybeans, tomato, rye, wheat, beans, potatoes, melons, alfalfa, spinach, onions and grapes. Other vegetation affected includes gladiolus, azalea, eastern white pine, loblolly pine, Virginia pine, locust, white oak and poplar. Many of these plants are of economic importance in North Carolina. Adverse effects on sensitive vegetation have been observed from exposure to ozone concentrations of 100 $\mu g/m^3$ (0.05 ppm) for four hours.

POLLUTANT: OZONE STATE: 34 NORTH CAROLINA YEAR: 1985

AREA	SITE	LOCATION	SAMPLING PERIOD	DAYS SAMPLED	METH	NUM OBS	1-HOUR 1ST	1-HOUR DATE	1-HOUR 2ND	MAXIMA DATE	MAXIMA 3RD	MAXIMA DATE	DAYS >.125*
0080	099 F05	TAYLORSVILLE/ SR 1108 & 1117	APR-OCT	214	14	5097	0.097	6/21	0.094	4/26	0.093	8/12	
0480	029 I03	BUNCOMBE CO/ FAIRVIEW SCHOOL, BUNCOME	APR-OCT	205	14	4714	0.083	5/27	0.078	4/19	0.078	4/30	
0700	034 G01	CHARLOTTE/ PLAZA ROAD AND LAKEDELL	JAN-DEC	360	11	8398	0.123	7/19	0.113	8/12	0.107	7/20	
0960	001 F03	FAYETTEVILLE/ EASTOVER FIRESTATION US 301	APR-OCT	212	14	4977	0.102	6/26	0.099	6/ 4	0.097	7/10	
1080	099 F05	FORK/ FORK RECREATION CENTER	APR-OCT	204	14	4674	0.116	9/20	0.099	8/12	0.098	7/19	
1300	099 F05	LEGGETT/ RT 2 BOX 195 TARBORO	MAR-OCT	223	14	5208	0.101	6/ 4	0.100	7/10	0.096	5/28	
1400	099 F05	FARMVILLE/ US 264 NEAR FARMVILLE WATER TOWER	MAR-OCT	214	14	4936	0.097	7/10	0.097	7/20	0.095	7/ 9	
1480	004 G01	FORSYTH CO/ WINSTON SALEM, PRINCE I8RAHAM	SEP-OCT	44	14	994	0.089	9/19	0.087	9/20	0.078	9/29	
1480	004 G01	FORSYTH CO/ WINSTON SALEM, PRINCE I8RAHAM	APR-JUL	111	11	2609	0.103	7/19	0.095	7/18	0.091	4/12	
1480	006 G01	WINSTON SALEM MID CITY / BELEWS CREEK RD	APR-AUG	153	11	3641	0.107	7/19	0.098	8/13	0.097	6/ 4	
1480	006 G01	WINSTON SALEM MID CITY / BELEWS CREEK RD	SEP-OCT	59	14	1378	0.089	9/19	0.088	9/ 8	0.084	9/20	
1700	001 F03	GRANVILLE CO/ BUTNER WATER TREATMENT PLT N.C.	APR-OCT	193	14	4282	0.109	4/30	0.099	4/19	0.099	7/19	
1780	011 F03	GUILFORD CO/ MCLEANSVILLE, GUILFORD	APR-SEP	183	14	4316	0.105	7/19	0.102	8/14	0.101	7/10	
2120	099 F05	MICRO/ HIGHWAY 301 AND SR 2141	APR-OCT	198	14	4594	0.089	6/ 3	0.089	6/ 4	0.087	6/ 1	
2360	099 F05	IRON STATION/ SR 1315 & SR 1313	APR-OCT	208	14	4938	0.110	7/18	0.098	6/10	0.098	7/19	
2560	099 F05	FARMLIFE/ SR 1538 & NC 171	MAR-OCT	202	14	4655	0.105	5/28	0.090	4/19	0.088	7/20	
2580	005 G02	MECKLENBURG CO/ MECKLENBURG COUNTY, ARROWOOD	JAN-DEC	365	11	8569	0.115	7/18	0.111	9/20	0.108	5/14	
2580	009 G03	MECKLENBURG CO/ 29 N@ MECKLENBURG CAB CO	JAN-DEC	365	11	8533	0.111	7/10	0.111	7/19	0.109	9/20	
2880	002 F03	NEW HANOVER CO/ NEW HANOVER, BLUEBERRY FARM	MAR-NOV	236	14	5473	0.094	5/26	0.091	4/26	0.091	6/26	
3140	099 F05	GORDONTON/ R 1102 & NC 49	APR-OCT	203	14	4748	0.105	7/19	0.100	7/20	0.096	5/28	
3380	099 F05	ST PAULS/ ST. PAULS NATIONAL GUARD ARMORY	APR-OCT	214	14	5034	0.111	7/19	0.108	6/26	0.098	6/25	
4180	001 F03	WAKE FOREST/ HWY 98 WAKE FORREST WATER TREATM	APR-OCT	210	14	4662	0.114	7/19	0.110	6/ 4	0.101	8/12	
1984 Data													
2300	003 F03	LENOIR/ HWY 321 NORTH LENOIR	MAR-OCT	225	14	5346	0.098	10/ 4	0.097	4/26	0.095	6/ 5	
2660	099 F05	JACKSON SPRINGS/ SANDHILLS RESEARCH STATION	MAR-OCT	220	14	5138	0.105	9/21	0.098	8/31	0.098	9/ 2	

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* THE AIR QUALITY STANDARD FOR OZONE IS 0.12 PPM (235 UG/M3). THE STANDARD IS ATTAINED WHEN THE NUMBER OF CALENDAR DAYS WITH CONCENTRATIONS GREATER THAN OR EQUAL TO .125 PPM IS NOT GREATER THAN ONE.

D. Sulfur Dioxide

More than 90 per cent of sulfur oxide emissions occur as sulfur dioxide (SO_2); the balance occurs as sulfur trioxide (SO_3) and various forms of sulfates. For this reason nearly all sulfur oxide ambient monitoring nationwide is for sulfur dioxide. It is a colorless gas that can be detected by taste at concentrations of 0.38 to 1.15 ppm.

SOURCES

The main sources of SO_2 are the combustion of fossil fuels containing sulfur compounds and the manufacturing of sulfuric acid . Other sources include refining of petroleum and smelting of sulfur-containing ores.

EFFECTS

The most obvious health effects of sulfur dioxide are irritation and inflammation of body tissues that are contacted by the gas. Sulfur dioxide can increase the severity of existing respiratory diseases such as asthma, bronchitis and emphysema. Breathing SO_2 causes bronchial constriction, which results in increased resistance to air flow, reduction of air volume and increased respiratory rate and heart rate. Asthmatics showed increases in airway resistance after exposures of only 5 to 10 minutes of SO_2 concentrations even below 0.5 ppm (1300 $\mu g/m^3$). Transformation products of SO_2 such as sulfuric acid aerosol and fine particulate sulfates may also cause significant health problems.

Sulfur dioxide can damage many types of vegetation. The injury symptoms usually consist of a bleaching appearance and can occur both between the veins and on the margins. Many plants of economic importance are sensitive to SO_2, including cotton, sweet potatoes, wheat, cucumber, alfalfa, peas, oats, gladiolus, tulips, blue grass, violet, zinnia, apple trees and several types of pine trees.

Another effect of SO_2 transformation products is the reduction of visibility. Sulfates are a major component of atmospheric fine particulate material, and because some sulfates have a water absorbing capacity, their impact on visibility is greatly increased at high humidities. Observations of widespread hazes in the eastern United States appear to be increasing with SO_2 emissions.

Another of the principal concerns is the suspected role of sulfur dioxide in causing acid rain, which is usually observed in regions of high sulfate concentrations. Acid rain can lower the pH of soils and natural waters, cause mineral leaching, damage vegetation and deplete fish populations in some lakes.

POLLUTANT: SULFUR DIOXIDE STATE: 34 NORTH CAROLINA YEAR: 1985

AREA	SITE	LOCATION	SAMPLING PERIOD	METH	NUM OBS	MAXIMA 1-HOUR 1ST	1-HOUR 2ND	3-HOUR 1ST	3-HOUR 2ND	24-HOUR 1ST	24-HOUR 2ND	ARITH MEAN	GSD	EXCEEDANCES * 3HR #>1300	24HR #>365	ANNL AM>80
0280	003 F02	AURORA/ N C HWY 306	JAN-DEC	20	7693	785	583	459	311	100	94	13	1.87			
0280	099 F05	BAYVIEW (GUM POINT)/ GUM POINT ROAD	MAR-DEC	20	5112	391	344	336	158	49	40	10	1.63			
0880	001 F02	COLUMBUS CO/ ACME-DELCO SAMPLING SITE H	JAN-DEC	20	7858	230	200	140	134	49	46	11	1.64			
1080	099 F05	FORK/ FORK RECREATION CENTER	JAN-DEC	20	7640	168	138	128	128	76	45	11	1.70			
1400	099 F05	FARMVILLE/ US 264 NEAR FARMVILLE WATER	JAN-DEC	20	8006	407	387	381	259	87	42	9	1.45			
1740	010 G01	GREENSBORO/ GREENSBORO, LATHAM TOWN HU	JAN-DEC	20	7757	159	132	116	113	78	57	13	1.82			
2060	002 F02	IREDELL CO/ TROUTMAN, ST. RD. 2350	JAN-DEC	20	7999	478	387	293	285	90	81	15	2.02			
2360	099 F05	IRON STATION/ SR 1315 & SR 1313	JAN-DEC	20	7460	394	357	320	266	117	82	12	1.78			
4460	022 G01	WINSTON SALEM/ CORNER 13TH AND HATTIE S	JAN-DEC	20	7867	377	264	180	155	78	69	17	2.02			
1984 Data																
0080	099 F05	TAYLORSVILLE/SR 1108 & 1117	JAN-DEC	20	7371	92	86	88	71	29	26	8	1.38			
1300	099 F05	LEGGETT/ RT 2 BOX 195 TARBORO	JAN-DEC	20	6900	146	146	146	135	70	69	12	1.73			
2120	099 F05	MICRO/ HIGHWAY 301 AND SR 2141	JAN-DEC	20	7210	180	99	98	95	44	40	9	1.50			
2560	099 F05	FARMLIFE/ SR 1538 & NC 171	JAN-DEC	20	7611	105	105	105	105	74	48	9	1.47			
2580	007 G02	MECKLENBURG CO/ MECKLENBURG, DUKE POWER	JAN-DEC	20	4680	507	448	305	295	108	106	36	2.29			
2660	099 F05	JACKSON SPRINGS/ SANDHILLS RESEARCH STA	JAN-DEC	20	8073	80	80	78	67	49	45	11	1.62			
3140	099 F05	GORDONTON/ R 1102 & NC 49	JAN-DEC	20	7789	227	205	185	155	59	59	11	1.66			
3380	099 F05	ST PAULS/ ST. PAULS NATIONAL GUARD ARMO	JAN-DEC	20	7963	71	65	68	50	38	36	9	1.42			

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* THE AIR QUALITY STANDARDS FOR SO2 ARE AN ANNUAL ARITHMETIC AVERAGE OF 80 UG/M3, A MAXIMUM 24-HOUR CONCENTRATION OF 365 UG/M3 NOT TO BE EXCEEDED MORE THAN ONCE PER YEAR, AND A MAXIMUM 3-HOUR CONCENTRATION OF 1300 UG/M3 NOT TO BE EXCEEDED MORE THAN ONCE PER YEAR.

E. Nitrogen Oxides

There are several oxides of nitrogen in the atmosphere, but the most prevalent ones are nitric oxide (NO) and nitrogen dioxide (NO_2).

SOURCES

The most important nitrogen oxide emissions occur as a result of man's burning of fossil fuels such as coal, oil and gasoline.

Nitrogen oxides are emitted from combustion sources primarily as nitric oxide (NO). Through reactions with other atmospheric compounds such as hydrocarbons and ozone, the NO is converted to nitrogen dioxide. Nitrogen dioxide may undergo further transformation into gaseous nitric acid (HNO_3) and nitrate particulates.

EFFECTS

Nitrogen dioxide has effects on human health, especially the sensitive members of the population. Asthmatics and children are likely to be affected by NO_2 concentrations as low as 0.5 ppm. Nitrogen oxides also indirectly affect human health by their contribution to the formation of ozone.

Some types of vegetation are very sensitive to nitrogen dioxide. They include, oats, alfalfa, tobacco, peas and carrots. The one primary symptom of chronic NO_2 exposure is chlorosis (yellowing), while acute NO_2 exposure usually causes the appearance of irregular-shaped lesions within the leaves. Earliest indications of injury are gray-green watersoaked areas located on the upper leaf surface.

Nitrogen dioxide and particulate nitrates are among the pollutants that cause visibility impairment. In high concentrations NO_2 gas is reddish-brown, and it is thought to contribute a significant portion of the brownish coloration often observed in polluted air in the colder months.

Nitrogen oxides also contribute to acid deposition by forming nitric acid. It has been estimated that nitric acid comprises approximately 25 to 30% of the acidity in precipitation.

POLLUTANT: NITROGEN DIOXIDE STATE: 34 NORTH CAROLINA YEAR: 1985

AREA	SITE	LOCATION	SAMPLING PERIOD	METHOD	NUM OBS	MAXIMA 1-HOUR 1ST	MAXIMA 1-HOUR 2ND	MAXIMA 24-HOUR 1ST	MAXIMA 24-HOUR 2ND	ARITH MEAN	GEO MEAN	A.M. GSD	A.M. AM>100
0700	034 G01	CHARLOTTE/ PLAZA ROAD AND LAKEDELL	JAN-DEC	14	6909	177	162			37	31	1.87	
4460	022 G01	WINSTON SALEM/ CORNER 13TH AND HATTIE ST	JAN-DEC	14	8651	139	128			28	22	2.06	

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* THE AIR QUALITY STANDARD FOR OXIDES OF NITROGEN EXPRESSED AS NITROGEN DIOXIDE IS 100 UG/M3 (0.05 PPM) ANNUAL ARITHMETIC MEAN

F. Lead

Lead compounds exist in the atmosphere as gases or particles.

SOURCES The major source of atmospheric lead is the combustion of leaded gasoline (Tetraethyl lead is added as an antiknock agent). Battery manufacturers are a minor source of lead in this state. Lead is also used in paints, insecticides and newspaper inks.

EFFECTS Lead (Pb) persists and accumulates in the environment and in the human body. It enters the body by eating and breathing and is eventually absorbed into the blood stream and distributed to all body tissues. Exposure to low concentrations interferes with specific enzyme systems and blood production. It is also believed to be a cause of kidney and nerve cell damage. Brain damage has been documented in cases of severe lead poisoning in children. Also noted were headaches, restlessness, tremors and general symptoms of mental retardation. Convulsions are not uncommon and may be followed by coma. People at greatest risk include battery workers, solderers and small children who play near lead sources.

MBIENT AIR DATA No lead measurements have been made in North Carolina since 1982. Ambient air lead monitoring was stopped as a result of the low values measured and as a result of the continuing decrease in the lead concentrations being reported. The 1982 ambient lead concentrations were approximately one-half of the 1979 levels. Two factors are believed to be responsible for this decrease in the ambient air lead concentrations. (1) The amount of leaded gasoline being used in North Carolina is decreasing each year, thus less lead is emitted from cars. (2) The quantity of lead in leaded fuel is being reduced by USEPA regulation, thus less lead is emitted from cars burning leaded fuel. The most recent (1981-1982) ambient air lead data is given below. Lead concentrations in 1985 are believed to be below the 1981-1982 levels.

Lead Concentrations In Micrograms Per Cubic Meter

Site	Oct-Dec '81	Jan-Mar '82	April-June '82	July-Sept '82
Fayetteville	.3	.3	.3	.4
Greensboro	.2	.4	.2	.2
Raleigh	.2	.3	.3	.5
Winston/Salem	-	.4	.2	.2

The Primary Air Quality Standard for lead is an arithmetic mean of 1.5 $\mu g/m^3$ averaged over a calendar quarter.